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RUSSIAN / ENGLISH TRANSLATION OF

Soviet Patent Application SU 1042809 A

Title: Continuous Bowl Centrifuge

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PATENT SPECIFICATION

Pertaining to a Certificate of Authorship

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(72) I. S. Zarkh, S. S. Shtol'ts and V. N. Petrakov

(71) All-Union Scientific Research and Design
Institute of Monomers

(53) 66.067.55(088.8)

(56) 1. Sokolov, V. I. Centrifuges. Moshgiz
Publishers, 1950, pp. 264-266.

2. FRG Patent No. 1158905, cl. 82 B 3/20,
1964 (prior art).

(54) (57) **CONTINUOUS BOWL CENTRIFUGE**,
containing a rotor, consisting of a series of chambers
for the separation of the suspension into fractions,
formed by disks positioned in pairs and parallel,
situated on a hollow shaft, the even-numbered ones

of which have holes along the movement path of
the suspension for the removal of the centrifuge
effluent and a feed tube, characterized by the fact
that, in order to increase the operational reliability,
the odd-numbered disks are mounted by means of
spacers on bars that pass through the openings for
the removal of the centrifuge effluent and are
connected to a drive mechanism for movement of
the odd-numbered disks relative to the even-
numbered ones and unloading of the sediment, in
which annular channels are positioned between
chambers for the removal of the centrifuge effluent,
while the hollow shaft has holes for supplying the
initial suspension into each chamber for the
separation of the suspension into fractions.

The invention relates to equipment for the separation of suspensions into fractions under the influence of centrifugal force and can be used in the chemical industry, for example, during concentration of an aqueous suspension of recrystallized terephthalic acid, and also in the coal industry and other branches.

A bowl centrifuge is known whose tank is replaced by a series of disks, equipped with wide flanges along the edge. The closed halves of the disks form chambers for the separation of suspensions. The pressure of the oil fed to the piston connected to the left disk counteracts the springs that open the disks. During operation of the centrifuge, the suspension is fed into chambers between disks through a hopper connected to the left bottom and then through openings in the latter into the chambers between disks. On completion of centrifuging, valves positioned on the right bottom are opened, through which the centrifuge effluent that accumulated above the sediment is removed. After this the oil pressure acting on the piston diminishes, the springs separate the disks and the sediment under the influence of centrifugal forces is ejected onto the walls of a slowly rotating housing from which it is withdrawn [1].

The shortcoming of this bowl centrifuge is that it has a low output because due to the termination of feed of the suspension for its settling, removal of the centrifuge effluent and unloading of the sediment, i.e., the bowl centrifuge is a batch machine.

The closest technical solution to the proposed one is a bowl centrifuge for continuous operation, containing a rotor, consisting of a series of chambers for the separation of a suspension into fractions, formed by disks positioned in pairs and parallel, situated on a hollow shaft, the even-numbered ones of which have holes along the movement path of the suspension for the removal of the centrifuge effluent and a feed tube. Separation of the suspension in the centrifuge occurs in chambers.

As sediment accumulates, inertial unloading of the sediment is carried out, which is eliminated through a series of holes situated along the perimeter of the rotor and opening by means of valves equipped with an electromagnetic drive [2].

A shortcoming of the known centrifuge for continuous operation is the limited zone of unloading and the possibility of clogging of the holes for the removal of the sediment. Moreover, in this centrifuge, despite the developed surface, the conditions of separation deteriorate because of the valves and their drives positioned within the rotor.

The objective of the invention is to increase the output of the centrifuge and its operational reliability.

This objective is achieved in that in a bowl centrifuge for continuous operation, containing a rotor, consisting of a number of chambers for the separation of the fractions, formed by disks situated in pairs and parallel, positioned on a hollow shaft, the even-numbered ones of which have holes along the path of movement of the suspension for the removal of the centrifuge effluent, and a feed tube, the odd-numbered disks are mounted by means of spacers on bars that pass through the holes for the removal of the centrifuge effluent and are connected to a drive mechanism to move the odd-numbered disks relative to the even-numbered ones and to unload the sediment, in which annular channels are positioned between chambers for the removal of the centrifuge effluent and the hollow shaft has holes to supply the initial suspension into each chamber for the separation of the suspension into fractions.

Figure 1 shows a bowl centrifuge for continuous operation, vertical section; Figure 2 shows section A-A in Figure 1; Figure 3 shows component I in Figure 1; Figure 4 shows the same in a variant.

The bowl centrifuge for continuous operation contains a rotor, consisting of a series of chambers 1 for the separation of a suspension into fractions, formed by disks 2 and 3 positioned in pairs and parallel, situated on a hollow shaft 4, the even-numbered nonmoving ones of which 2 have holes 5 along the path of movement of the suspension for the removal of the centrifuge effluent. A feed tube 6 to supply the suspension is positioned in the cavity of shaft 4. The hubs of the even-numbered fixed disks 2 are fastened in succession onto shaft 4 by means of pins 7 (Figure 2).

The hub of the lower disk 2 is based on the bar of shaft 4, while the hub of the upper odd-numbered disk 3 is supported on the limiting nut 8. Overall this forms a fixed set of disks relative to shaft 4. The odd-numbered moving disks 3 are mounted with the hubs along a sliding fitting on the hub of the even-numbered nonmoving disks 2 and are mounted by means of spacers 9 on bars 10 passing through the openings 5 for discharge of the centrifuge effluent and connected to the drive cam mechanism 11 for displacement of the odd-numbered moving disks 2 relative to the even-numbered fixed disks 3 and unloading of the sediment. The odd-numbered moving disks 3 are rigidly connected to each other by rods 10, spacers 9 and clamping flange 12 and thus form a stack. In the lower part of shaft 4 there is a sleeve for positioning of spring 13,

which clamps the support 14 of flange 12 to the drive cam mechanism 11. Annular channels 15 for discharge of the centrifuge effluent are situated between chambers 1, the discharge connectors 16 of which are connected to header 17, while the hollow shaft 4 has openings 18 to supply the initial suspension into each chamber for the separation of the suspension at the fractions.

The four fixed disks 2 have radial deflectors 19.

Moreover, there are openings 20 connected to the openings 18 for supply of the suspension in the hubs of the even-numbered fixed disks 2.

A sediment receiving zone is formed between housing 21 and the wall of the annular channel 15 for discharge of the centrifuge effluent. The edges of the moving odd-numbered disks 3 and the fixed even-numbered disk 2 can be smooth or made thicker (Figure 3, 4) with annular protrusions 22, grooves 23 and spacers 24.

The holes 18 for supplying the initial suspension and hole 5 for discharge of the centrifuge effluent are located in different sectors. Header 17 has a connector 25.

The bowl centrifuge for continuous operation operates as follows,.

The suspension is continuously fed into the internal cavity of shaft 4 through a feed tube 6. The suspension then enters the separation zone through holes 18 and 20, this zone being formed by the closed even-numbered fixed disks 2 and the odd-numbered moving disks 3.

The suspension is separated under the influence of centrifugal forces: the centrifuge effluent reaches the outside surface of the odd-numbered moving disk 3 through the hole 5 of the even-numbered fixed disk 2 and from it is discharged by means of radial deflector 19 into the annular channel 15 and flows through connector 16 into the vertical tubes of header 17 and from there the centrifuge effluent is taken off through connector 25.

When the drive cam mechanism 11 is pressed against support 14 of the clamping flange 12, spring 13 is compressed and the stack of odd-numbered moving disks 3 is raised upward, forming annular channels between the odd-numbered moving disks and the even-numbered fixed disks, through which part of the sediment is discharged under the influence of inertia.

The sediment enters the receiving zone formed by housing 21 and the wall of the annular channel 15 from which it is unloaded.

The slope angles of the walls of the disks must be greater than the angle of repose of the material being centrifuged.

When the drive cam mechanism 11 separates from support 14, the stack of odd-numbered moving disks 3 is displaced downward by spring 13, covering the annular channels of the separation zones.

The sediment accumulation time, the unloading time and the size of the gap between disks depend on the profile of the drive cam mechanism and its rotational speed.

Creation of an unloading zone along the entire perimeter of the rotor and the absence of valves in the chambers means that the proposed centrifuge is more productive and reliable in operation in comparison with the known one.

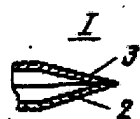
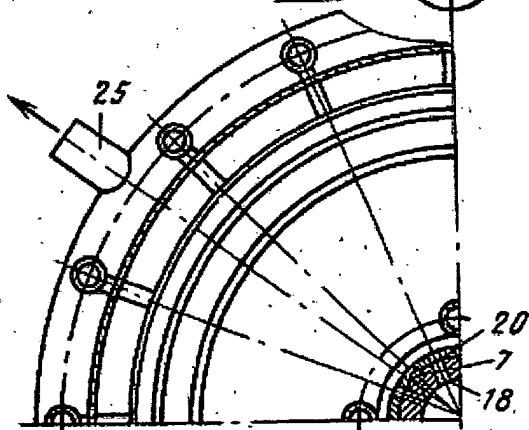
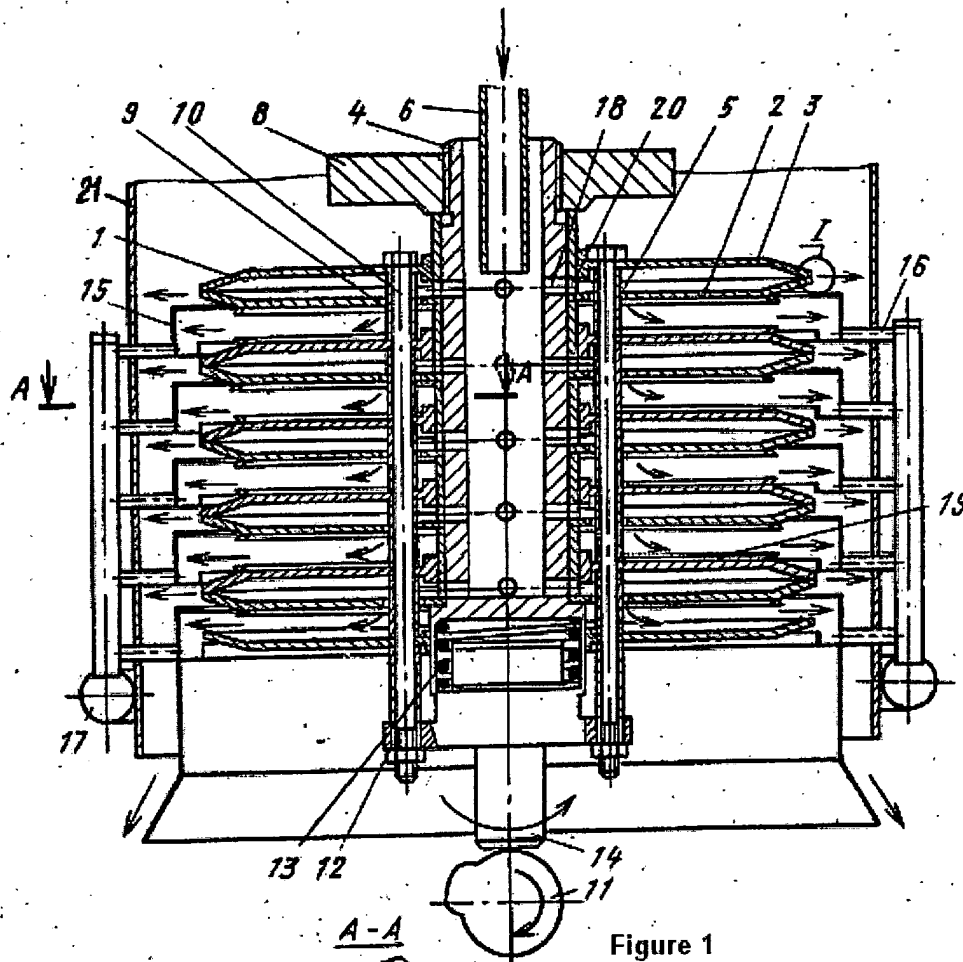


Figure 2

Figure 3

Figure 4